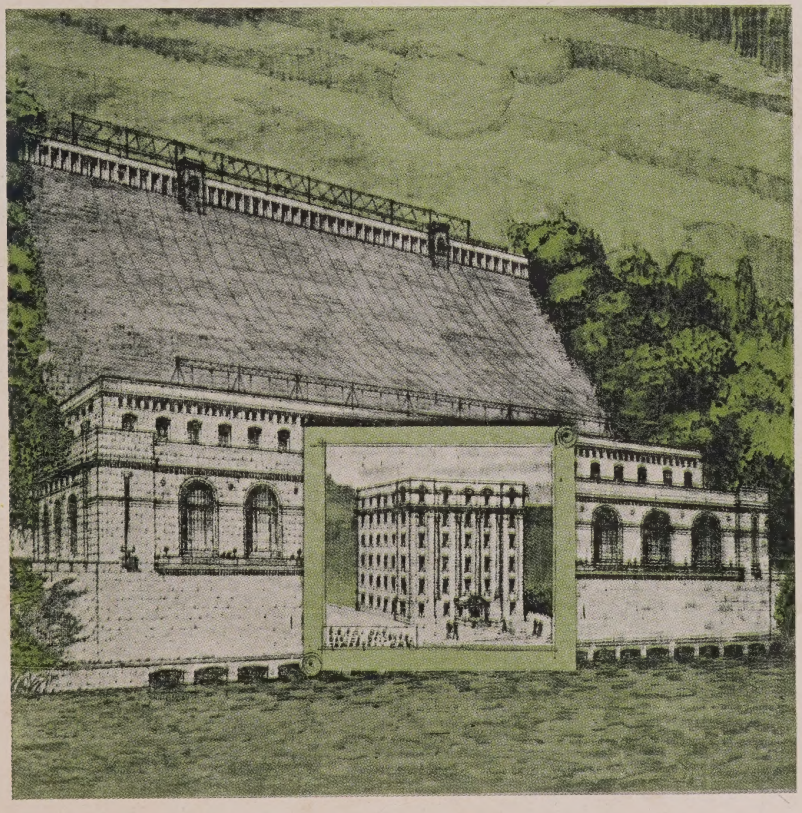
THE BULLETIN

Vol. VII. No. 7

Hydro-Electric Power Commission of Ontario

SEPTEMBER 1920



New Queenston Generating Station.

THE BULLETIN

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VOL. VII. No. 7
SEPTEMBER 1920

Permanent Electrical Features Queenston-Chippawa Development

By E. T. J. Brandon
Electrical Engineer, Hydro-Electric Power Commission of Ontario

HEREIN is given general information regarding the electrical features of the initial installation of electrical equipment at Queenston. The building which will be constructed at present will be 350 feet long, the ultimate length being in the neighborhood of 600 feet. The main generator room will be about 60 feet wide by 60 feet high.

Illustration No. 1 shows a study of the interior treatment of one end of the generator room with three units. The reader will note that the floor is level with the top of the generator frame. Space between this floor and a floor at the bottom of the generator is utilized for cooling air ducts, power leads and piping. The top of the generator frame determines the height of the generator room, consequently considerable useful space is attained by this feature at a comparatively small expense. The space devoted to transformers and low and high voltage switching is aproximately 90 feet

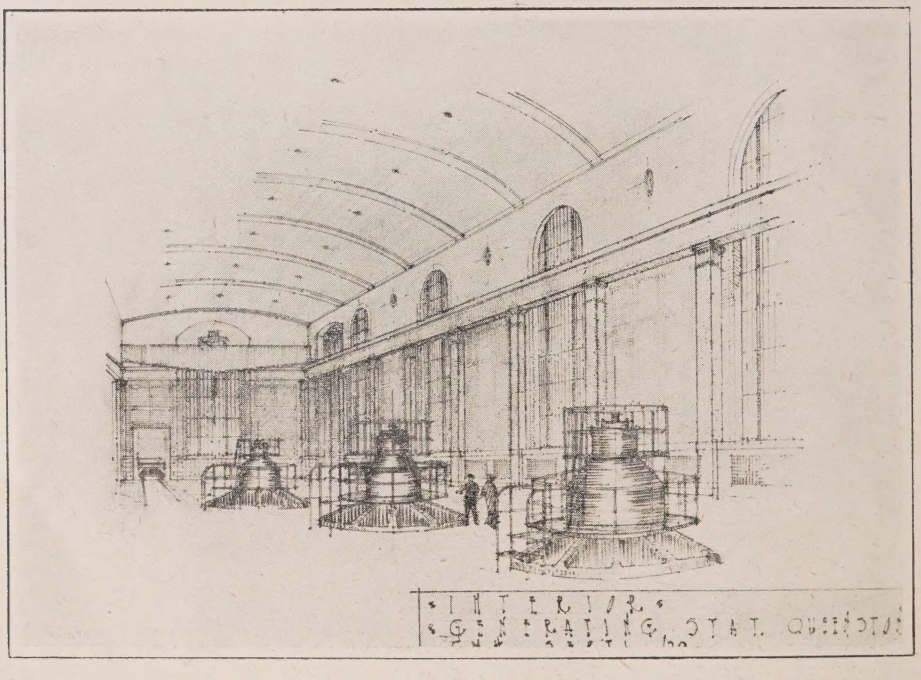


Illustration No. 1—A study of the interior treatment of one end of the Generator Room, with three Units.

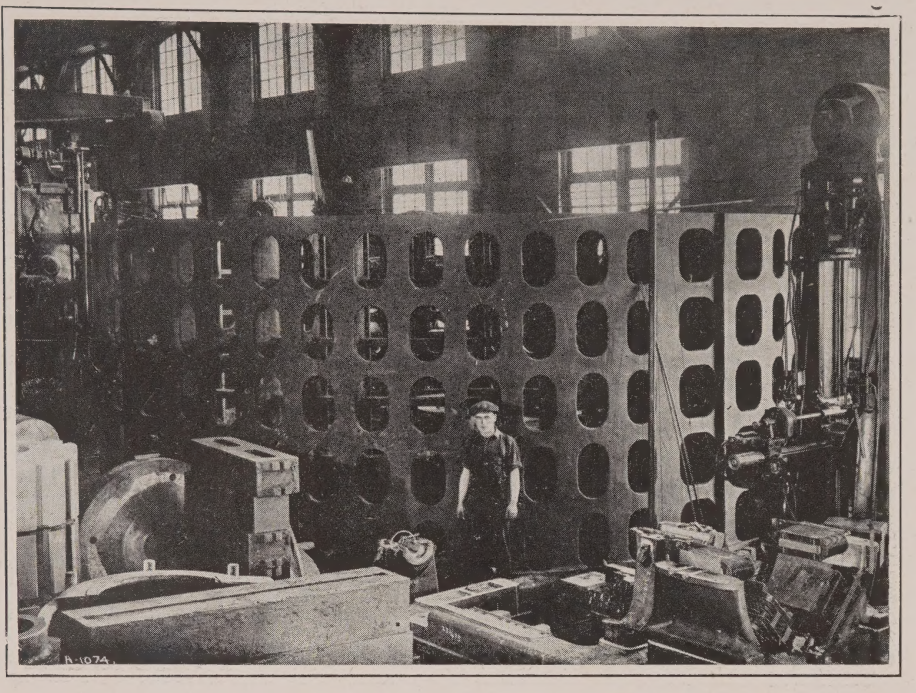


Illustration No. 2—The Frame of one of the Generators.

wide and 100 feet high. The entire equipment belonging to one unit, consisting of generator, high and low voltage switching and transformers, occupies a unit length of station of 50 feet. The five units at present on order will require 250 feet of the generating station, whereas the remaining 100 feet will be utilized for erection space and service equipment.

The colored view on the cover shows an elevation of the ultimate station as viewed from the Gorge road on the American side of the Niagara River with an inset of the Administration Building in Toronto drawn to the same scale. This gives an idea of the magnitude of the building.

The generators, of which five are on order, are rated at 45,000 Kva., 12,000 volts, 25-cycle, 187½ r.p.m. They are a vertical-shaft type with thrust bearings and direct-connected exciters mounted above the generator proper. The thrust bearings to be used are designed to carry a load of about one million pounds. In the neighborhood of 100,000 cubic feet of air per minute will be required to cool the generators at full load. The air system is completely enclosed so that the cooling medium can be taken from and discharged to the outside air without mixing with the air inside the station. It is interesting to note that the weight of air passing through the generator every three hours equals the complete weight of the generator itself.

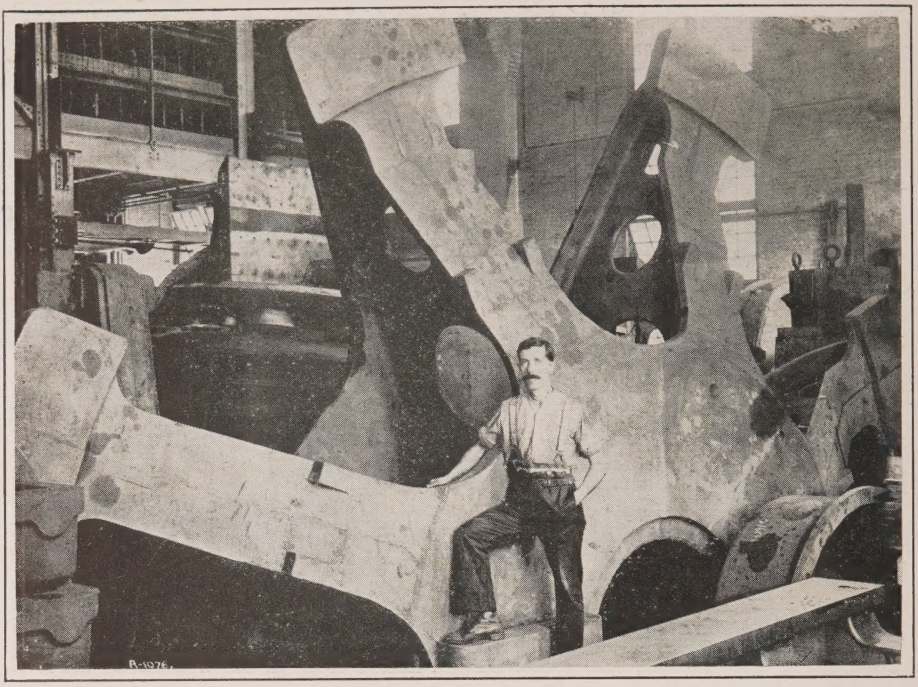


Illustration No. 3—Half of an upper bracket for one of the Generating Units in course of construction.

Illustration No. 2 shows the frame —Illustration No. 3 shows half of an upper bracket for one of the generating units in course of construction.

In the present installation there will be fifteen 15,000 Kva., 25-cycle, single-phase transformers which will be used for transforming from generator voltage of 12,000 to a nominal voltage of 110,000. Taps are however, provided in high voltage windings to permit operation at 132,000 volts.

Provision is being made for operation on the "unit" system, that is, the generator, bank of transformers and transmission line will be considered as a unit, and have the same capacity so that in case of emergency a unit may be operated to full capacity without utilizing either the high or low voltage busses. Provision will also be made so that units may be operated in parallel on either the high or low-voltage bus, current limiting reactors being provided between generators at 12,000 volts. With 8 units paralleled without current-limiting reactors it will be possible to obtain about 2,800,000 Kva. in a fault. Such a condition with busses 24-inch centres would impose mechanical forces tending to separate the busses of the order of one and one-quarter tons per lineal foot. However, oil switches have not been developed as yet which will rupture such large amounts of energy and it is not intended that the units would be operated all tied together

without reactors. The two limits of operation are operating the units entirely separated and with 8 units paralleled as above. The former imposes a possible short circuit Kva. of probably 360,000 and 230,000 on the low and high-voltage circuits respectively, while the correspondingly short circuit Kva. for the latter are 2,800,000 and 1,800,000.

All electrical equipment contracted for to date, excepting some minor accessories, and aggregating in value in the neighborhood of $4,000,000, will be made in Canada.

Distribution of Hydro Power in Bruce County

A BRIEF description was given in the March, 1920, BULLETIN of the then proposed extension of the Eugenia System transmission lines into Bruce and Huron Counties, as well as details of the completed extension to the Eugenia power development for supplying electrical energy to these lines.

The construction of these lines has since been undertaken by the Commission and the work is rapidly nearing completion at the present time.

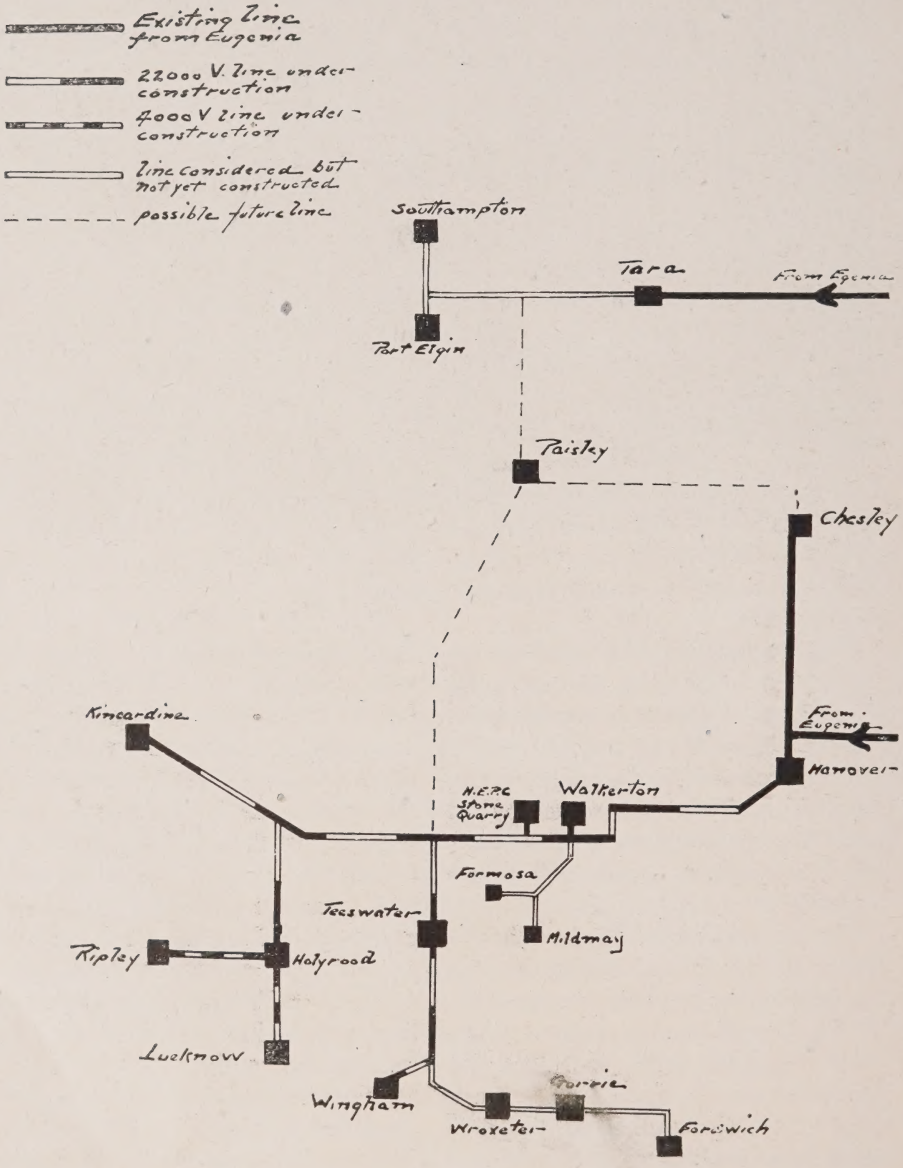
The accompanying sketch illustrates the areas which will be served by the new lines and the location of the various municipalities which will utilize the power.

The distribution of Hydro-Electric power in the Bruce County district has been given careful consideration by the Commission at various times during the past eight years, and the difficulties encountered in the past, peculiar to this section of the province, have finally been overcome.

Before the construction of the Eugenia Development and transmission lines, estimates covering delivery of power from the Niagara System indicated that the loads were insufficient for extending the 110,000-volt lines into the Bruce County district and that the distance between the nearest Niagara step-down station and the various municipalities was too great for utilizing lower voltage lines.

After the construction of the Eugenia development and lines, plans were perfected for extending the latter to Wingham, Kincardine, and other adjacent towns and villages, but the financial problems occasioned by the War made it necessary to postpone this work until it was possible to finance same under more favorable and opportune circumstances. At the conclusion of the war, however, the scheme was revived and an effort made to undertake the building of lines and stations with successful and satisfactory results. The by-laws in most of the municipalities having been submitted to the ratepayers and carried by almost unanimous majorities, and contracts having been executed between the towns and the Commis-

Lines and Stations—Bruce County Extension to Eugenia System



Note—This is a diagram only. It is NOT *drawn to scale.*

sion, work was begun during the month of August, and has progressed to such an extent to date that all poles have been erected from Hanover to Kincardine, and in all probability, the poles between Teeswater and Wingham will be erected by the time that this BULLETIN is published.

The stringing of the conductors has been completed as far as Teeswater, and the balance of this work will be rushed as fast as possible so that power may be available for use in the municipalities with the least possible delay.

Sub-station buildings have been completed in Wingham and Teeswater, and are under construction at Holyrood and Kincardine. The first sub-station on the new line will be located at the Commission's Stone Quarry, near Walkerton, and will be an outdoor type consisting of three 100-Kva, single-phase transformers, 60-cycle, 22,000/550-volts, with air-brake switches and Delta-Star arresters on the primary side.

The stations at Teeswater, Wingham, Holyrood and Kincardine will be of brick construction, with transformer capacities as follows:—

Teeswater	3- 50 Kva.
Wingham	3-250 Kva.
Kincardine	3-125 Kva.
Holyrood	3-100 Kva.

the voltage and frequency being similar to the Stone Quarry station.

The Holyrood station will serve Ripley and Lucknow in common, with a separate 4,000-volt feeder for each of these villages; the other station being for local purposes only until such time as rural loads in the adjacent district develop.

The distribution systems in the various municipalities require rebuilding and construction work in Kincardine is now progressing under the supervision of the local superintendent.

The Commission has been requested to perform similar work in the other municipalities, and the Lucknow local system is now under construction. Material has been ordered and shipped for the Teeswater system and the construction will begin immediately. The building of the Ripley system will probably start during the month of October.

The Wingham system can be connected to the Hydro lines with very slight changes, consequently, the principal portion of the reconstruction work in this town will follow the completion of the distribution systems in the other municipalities.

The Commission is negotiating with the Walkerton Electric Light and Power Company, for the purchase of that company's development at Walkerton, and as soon as the details of the transaction are completed, the generating station will be tied in with the Eugenia System and operated in parallel with it. This arrangement will enable the Commission to serve Walkerton, Mildmay and Formosa from the combined systems, and to obtain better regulation on the Bruce County lines. Provision will also be made at the same time to take on the Saugeen Power Company's plant at Southampton, which is owned and controlled by the same people as the

Walkerton plant. Such an arrangement will enable the Commmission to extend the Eugenia lines west from Tara and serve the municipalities of Southampton and Port Elgin.

Due to the present cost of coal and to the difficulties in obtaining it, many industries now being operated by steam will greatly benefit by the introduction of Hydro power in the district and it is anticipated from surveys of the power market made by the Commission's engineers, that the loads on the new lines and stations in the Bruce County District will very soon approximate the capacities of the various sub-stations serving them. At the same time, a steady growth in the demand for power is assured by reason of the fact that the district is well developed agriculturally and industrially, and up to the present time has never had the advantage of an unlimited supply of Hydro-Electric power.

The extension west from Hanover will consist of a single circuit, 22,000-volt, 3-phase, 60-cycle transmission line carried in a horizontal position on one crossarm, with a ground wire at the pole top on standard 40-ft. Western Cedar poles. The conductor is No. 1/0 steel reinforced aluminum on the main line—Hanover to Kincardine; Teeswater to Wingham; with No. 2 steel reinforced aluminum for the branch lines to Holyrood and Gorrie. The 4,000-volt lines to Ripley, Lucknow and Fordwich will consist of a single circuit, three-phase line carried in a horizontal position on one crossarm, with a ground wire on the pole top on standard 30-foot Eastern Cedar poles, the conductor being No. 2 steel reinforced aluminum.

The distribution systems in most of the towns will be one and three-phase primary approximately 4,000 volts between phases and 2,200 volts to ground connected "Y" with a common grounded neutral for both primary and secondary, with three-wire, 110-220-volt secondaries for lighting purposes. The only exception to the above being Wingham and Kincardine, in which cases the primary will be a "delta" connected 2,200-volt system, for the purpose of permitting the use of 2,200-volt, three-phase, 60-cycle generators as synchronous condensors. These two towns having such equipment available and desiring to use same for power factor correction, it was considered best to design their systems accordingly, rather than resorting to the expense of rewinding the machines for a "Y" system.

It is expected that Wingham will be receiving power by the month of November, and that most of the other towns will be operating from the new lines before the end of the present year.

The construction of lines, station buildings, and distribution systems, as well as the installation of station equipment, is being performed by the Commission based on the design and plans of the Commission's engineers.

Canada has the largest combination elevator in the world at Port Arthur; capacity 10,000,000 bushels.

Canada's trade more than doubles in five years.


I MIGHT FIND TIME SUNDAY AFTERNOON
COME ON !
CHIEF ENGINEER
Harland 1920.

Technical Section

The Approval Testing Work of the Commission

By W. P. Dobson

Laboratory Engineer, Hydro-Electric Power Commission of Ontario

THE work of inspecting electrical installations to eliminate hazard from fire or accident involves two closely related but separate features. The first of these has to do with the method of installation, the second with the condition of the materials and apparatus installed. The first involves a visual examination of the completed installation, the second, a study of the materials and apparatus used, in order to detect any features which would introduce a fire or accident hazard. The Inspection Department of the Commission is responsible for the inspection of completed installations, the Approval Laboratory is charged with the duty of testing and examining all devices, apparatus and fittings, which may be used in an installation coming within the scope of the Inspection Department. As an example, the Approval Laboratory would test an electric range and approve it for use in the Province of Ontario. The Inspection Department would require that the range be connected to the circuits in the proper manner as prescribed by the wiring rules, being first assured that the range had been tested and approved.

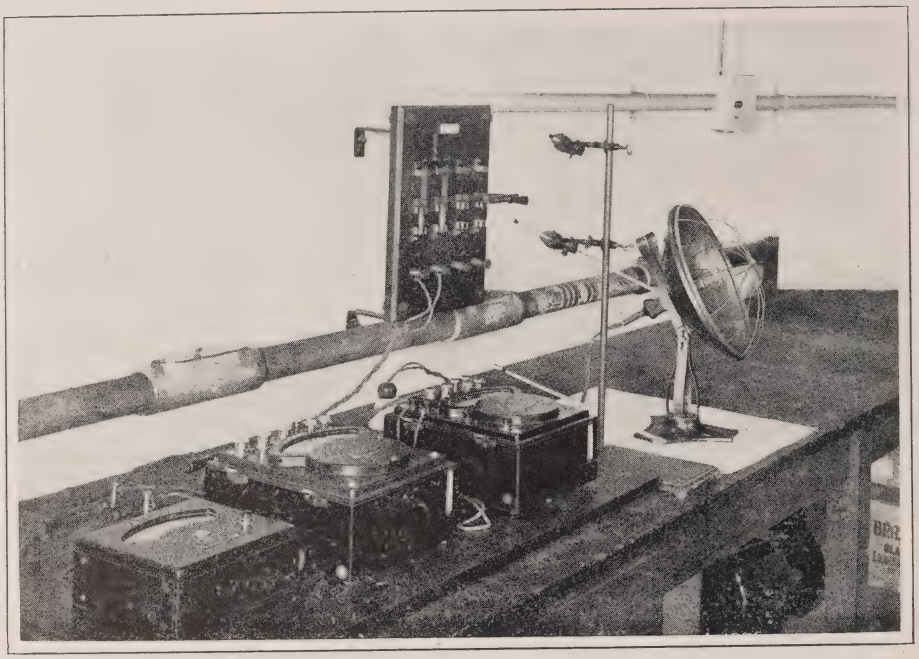
In the early days of the Electrical Inspection Department, the work of approval was carried on by that department in conjunction with inspection, but it was found difficult to conduct satisfactory tests on devices and materials without laboratory facilities and considerable numbers of electrical devices began to appear on the market which possessed hazardous features. In view of this situation the duty of examining and testing was delegated to the laboratories, and a staff was organized in 1917 to carry on this work under the name of the Approval Laboratory.

Scope of Work

The approval work involves two distinct features—the fire hazard and the accident hazard. The elimination of both of these from electrical appliances constitutes the approval testing work of the Commission.

While any device designed to operate on a circuit of over 10 volts comes within the scope of the Approval Laboratory, the work has heretofore been confined chiefly to devices rated at 600 volts or less, and especially to those classes of appliances which are

Insulation Test on a Motor Compensator.



Temperature test on an Air Heater of the reflector type. This test determines the power consumption and the maximum temperature reached at various points on the frame of the heater.

sold to the public for indiscriminate use.

Method of Procedure

It is incumbent upon the manufacturer to obtain approval of the design and construction of his product before offering it for sale in Ontario. To obtain this approval, the device in question is sent to the Laboratories accompanied by a formal application to the Commission. The necessary tests are then carried out and the manufacturer advised of the changes, if any, which are necessary to bring the device up to standard. It is sometimes necessary to submit two or more samples before one is produced which is in accord with the requirements. When a device has finally been constructed which is considered by the Laboratory to be free from fire and accident hazard, a report is prepared describing in detail the construction of the device, the tests which were made upon it and a recommendation that it be approved.

Approval Committee

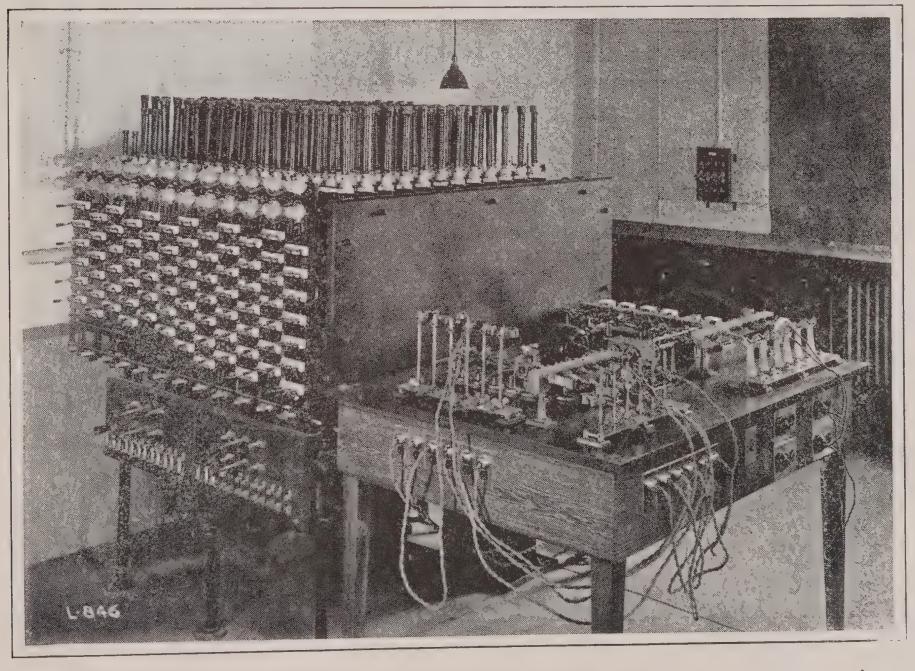
This report is submitted to each member of a Committee composed of representatives of the Hydro-Electric Power Commission, the electrical manufacturers, dealers, jobbers and professional societies, and the Fire Underwriters. Each member of this committee is asked to read the report and signify his approval or disapproval. When agreement among the members of the committee has been reach-

ed the report is presented to the Commission with the recommendation that the device in question be approved for use in Ontario.

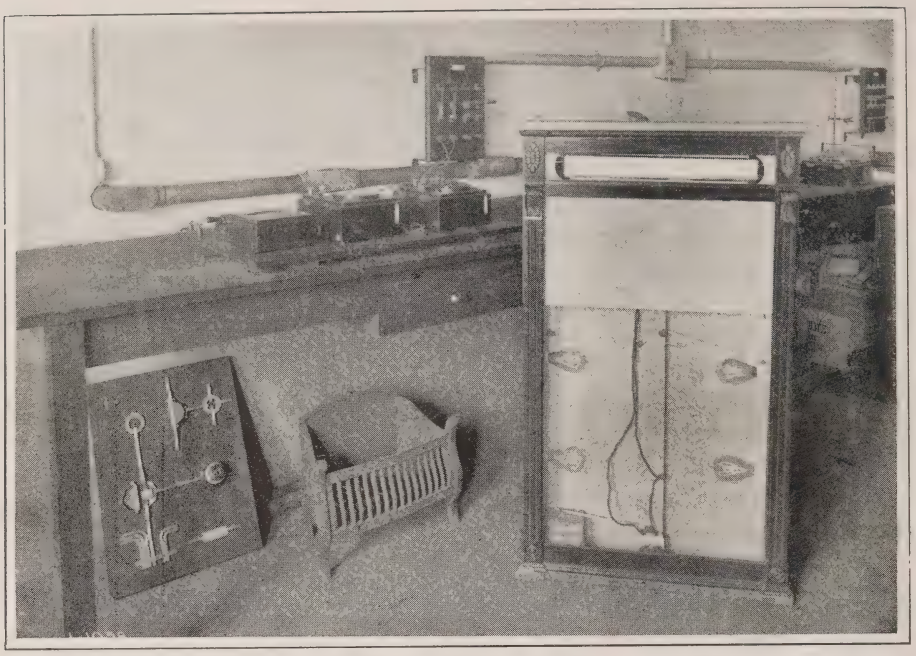
When the recommendation has been sanctioned by the Commission the manufacturer is so advised and an "approval number" is issued which serves to identify the particular device or line of devices approved. A card index of approved devices is distributed to the district inspectors of the Commission, and to others interested. This forms a continuous record for the use of the inspectors and contains sufficient information to enable them to identify any approved device which may be brought to their notice. A sample approval card is shown on the next page.

Re-Examination

When a device has been approved, the manufacturer enters into an agreement with the Commission to manufacture all future devices in exact duplicate of the sample approved and to permit a representative of the Commission to visit his factory periodically in order to examine representative samples of his product. The Commission agrees to allow its name to be placed upon the device together with the approval number mentioned above, thus signifying that it has passed the necessary tests. This is usually accomplished by placing on the name plate the abbreviation "H.E.P.C. App. No.———." On certain devices such as enclosed switches, cabinets, conduit, fuses, etc., labels



Machine for making tests on Switches. The required test is 6,000 operations at normal current and voltage. A small motor drives several shafts which operate mechanisms to open and close the switches. The tubular devices shown at the upper left are resistances, which are used to load the switches.



Temperature test on an Electric Grate. Devices of this kind are run at full load and thermometer readings taken at various points to determine the maximum temperatures reached.

May 26, 1919, Approval No. 900.

SMITH ELECTRIC CO., MFR.,
Montreal.

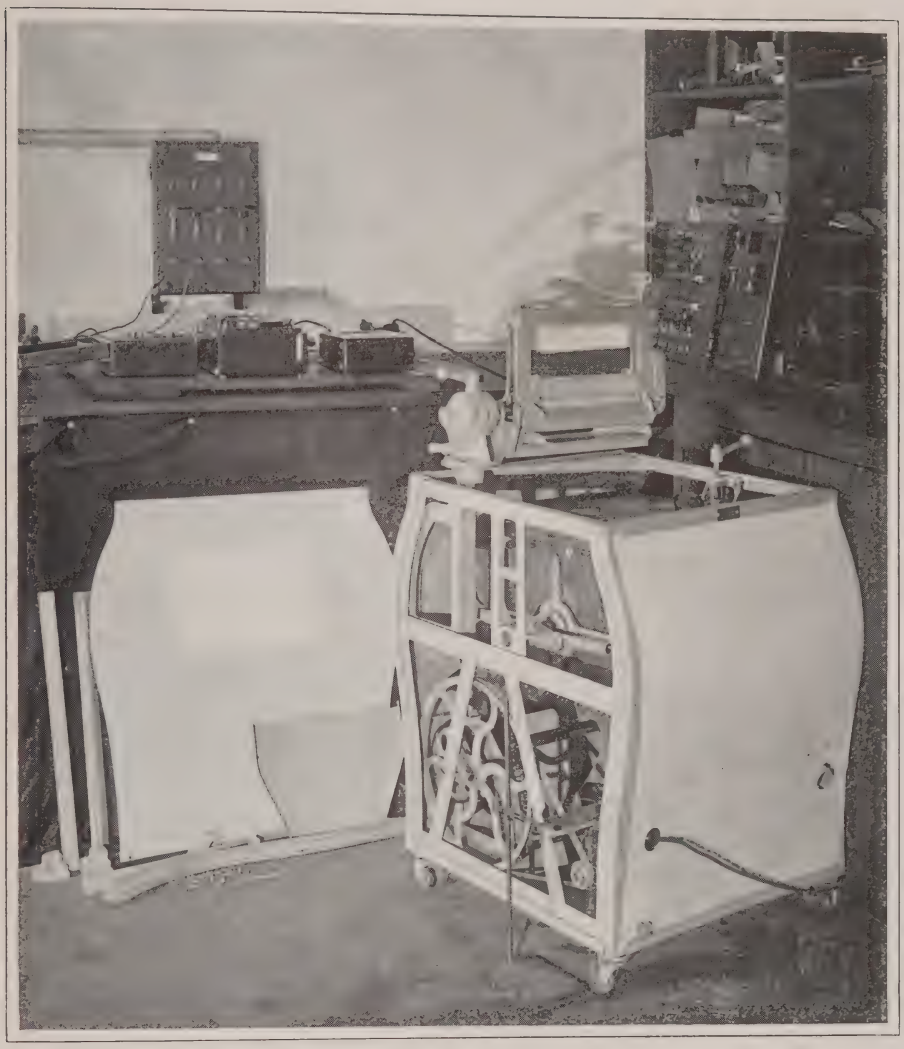
PRESSING IRONS.

Domestic Irons 550 watts,	Cat. No. 212, 100-110 volt.
	Cat. No. 212A, 220 volts.
Tailors Iron 600 watts,	Cat. No. 100, 100-110 volts.
	Cat. No. 100A, 220 volts.

APPROVED.

RE-EXAMINATION SERVICE.

This card is issued by the Hydro-Electric Power Commission of Ontario.



Test on an Electric Washing Machine. This class of appliance is tested for power consumption with tub filled, also for temperature rise of the motor. A thorough examination is also made to detect exposed live parts and other accident hazards.

are used. These are furnished by the Commission and are affixed by the manufacturer. This factory re-examination service is supplemented by laboratory tests on samples purchased in the open market.

By this means it is possible to keep a continuous check upon the various classes of electrical devices and to detect cases of hazardous construction.

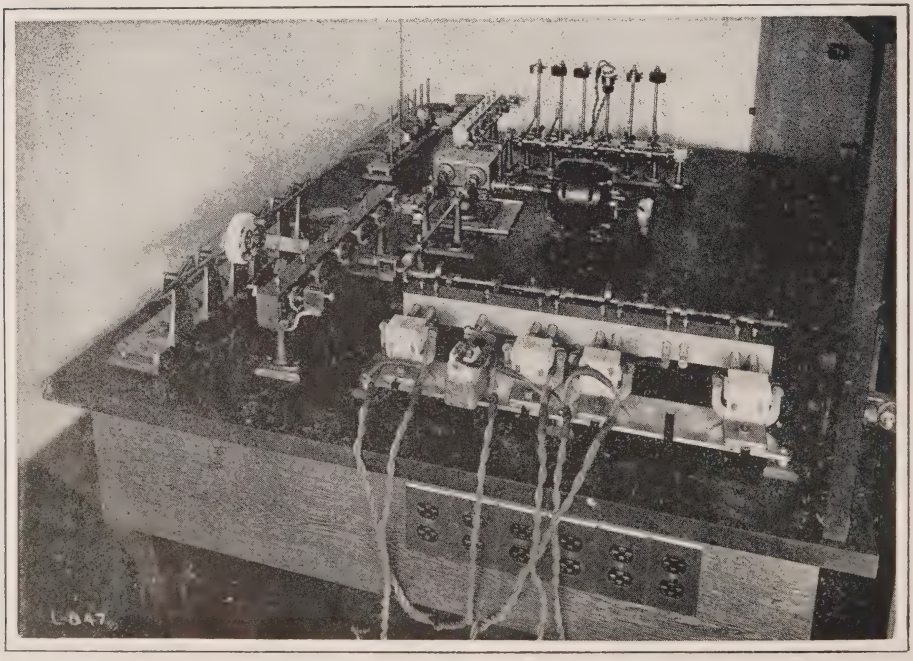
The approval testing service has also been requested by manufacturers

in other provinces and in the United States. Many of these however have obtained approval of their goods from Underwriters' Laboratories of Chicago. In such cases they are not required to undergo the expense of a separate test in the Laboratories of the Commission, but may have their devices listed in the records of the Commission upon payment of the cost of listing. It is necessary, however, that all such devices be so listed before they can be offered for sale in Ontario.

Standards

Closely connected with the work of testing is that of preparing standards and specifications governing the construction of electrical devices. These must be prepared to serve as a guide to the manufacturer in the design and construction of his product. The Standards adopted by the Commission agree in all essential details with those of the Underwriters' Laboratories and take into acount standard practice in electrical construction as obtaining in Canada and the United States. These however are not as yet complete and new standards are added as they are prepared by the Commission with the collaboration of the manufacturers and other interested bodies. Those at present in force include:

Rubber-covered Wire and Cable, Conduit, Armored Cords and Cable, Cartridge Enclosed Fuses, Snap Switches, Cabinets and Cutout Boxes,



Another view of Switch Testing Machine, showing a snap switch, a pull chain switch, and several flush switches under test.

Electric Signs, Panelboards, Knife Switches, Cutout Bases, Soldering Lugs, Flexible Cords, Ground Clamps and Enclosed Switches.

In addition to these, standards are in preparation covering Electric Washing Machines, and Air Heaters.

In the work of approval and in the preparation of specifications, the Laboratory works in co-operation with the Underwriters' and with Electrical Inspectors in other provinces.

The Commission is also rendering assistance to the Canadian Engineering Standards Association in its efforts to secure the adoption throughout the whole of Canada, of Standards for the construction of electrical devices which will tend to eliminate danger of fire and accident. The completion of this work will mark a big advance in the standardization of electrical appliances and will reduce to the minimum the chances of accident due to faulty construction or improper use.

Water Power Development in Canada

THE Dominion Water Power Branch, Department of the Interior, and the Dominion Bureau of Statistics, Department of Trade and Commerce, have through co-operation, recently completed an exhaustive census and analysis of the developed water power in Canada. The figures, which are complete to January 1, 1920, are exceptionally interesting and are indicative of the marked manner in which the water power resources of the Dominion are being put to advantageous use.

According to a recent computation the water power resources of the British Empire have been placed at from fifty to seventy million horsepower. This does not include such territories, formerly under control of the Central Powers, as will fall in future under British influence. To this total Canada contributes in the neighborhood of twenty million horsepower. This figure represents the power available at sites at which more or less definite information is to hand. Continued investigation will undoubtedly add to this figure.

According to the statistics just compiled there is installed throughout the Dominion some 2,418,000 turbine or water-wheel horsepower of which 2,215,000 horsepower is actually and regularly employed in useful work. The larger figure includes the total installed capacity at full gate, including reserve units. It does not, however, include hydraulic exciter units. A large number of the plants now operating are designed for the addition of further units as the market demands. The ultimate capacity of such plants, together with that of new plants now under construction, total some 3,385,000 horsepower.

The total installed water-wheel and turbine horsepower in hydro central electric stations is 1,756,791 horsepower. Fuel auxiliaries installed as stand-bys to these hydro stations brings the total installed primary cap-

acity up to 1,873,989 horsepower connected to 1,449,180 Kva. dynamo capacity. The total capital invested in these central stations, inclusive of transmission and distribution systems, is $369,464,961 or an average of $210 per installed primary horsepower.

The figures of seventy representative hydro-electric stations throughout the Dominion with an aggregate turbine installation of 745,797 horsepower show a total construction cost of $50,740,468 (pre-war figures) or an average of $69.11 per installed horsepower. This cost includes the capital invested in construction of dams, flumes, penstocks, and all hydraulic works, and of power stations and equipment. It includes real estate and transmisison and distribution equipment. The figure in brief represents the capital cost of construction at the power site.

With a water power development of 274 horsepower per thousand population, Canada stands well in the forefront in respect to availability and utilization of hydro-electric power resources, being only surpassed in this respect by Norway. The enormous water power reserves still untouched form a substantial basis for the progressive exploitation and development of other natural resources, and, if properly co-ordinated with the development and utilization of the enormous fuel resources of the Dominion, are an assurance of continued industrial expansion and prosperity.

Canada has the largest fresh water body in the world—Lake Superior—which is 31,000 square miles.

The Soo Canals have three times more traffic than the Suez Canal.

An Analysis of Electrical Fire Causes

By Charles H. Lum
(*Member N.F.P.A.*)

ELECTRICITY as a cause of fire is credited, for the year 1918, with a total of 15,691 fires, with a loss of $20,780,307 in the United States, according to statistics compiled by the Actuarial Bureau of the National Board of Fire Underwriters. This loss is annually increasing, in spite of the apparently thorough safeguards now thrown about all use of electric current.

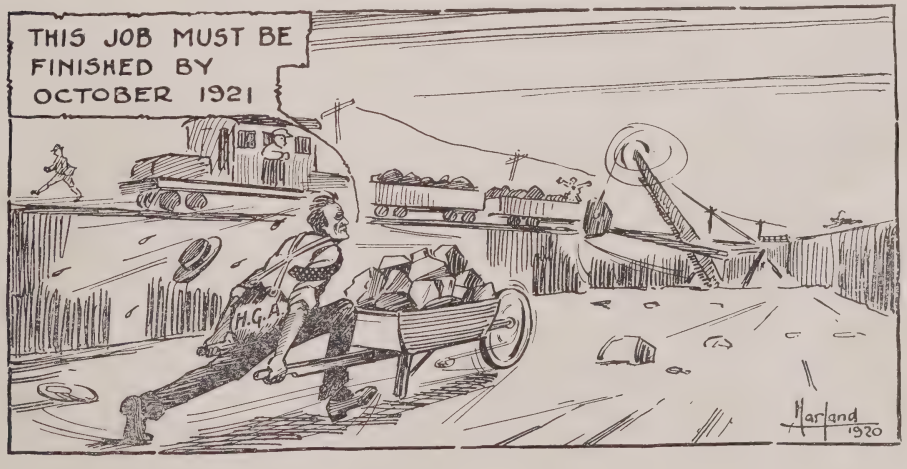
The records of the Actuarial Bureau show the electrical fire losses and their relation to the total for the United States as follows (1918 is the last year for which statistics are complete) :

Year	Electrical Fires	All Fires	Per Cent. Due To Electricity
1915	$11,136,930	$164,121,299	6.8%
1916	16,559,433	208,706,362	7.9%
1917	19,885,522	231,628,040	8.6%
1918	20,780,307	283,103,101	7.3%

That these figures are well below the actual destruction from this cause is indicated by the fact that, in coding for tabulation any fire which is ascribed to "unknown cause, but possibly or probably electricity," is assigned to the class of "unknown causes." This is done even in cases where defective wiring is ascribed, but no further explanation or description is given, for it has been found that "electricity" and "rats and matches" are frequently used by adjusters in designating the cause of a fire which is in reality of unknown cause. Moreover, the statistics compiled by the Actuarial Bureau include only reported fires; it is estimated that the totals should be increased at least twenty-five per cent. to cover the large number of fires which are not reported. It is, therefore, more than reasonably safe to state that the figures for electrical losses are conservative.

Attention is called to the very decided increase in the amount of these losses, an increase of $9,643,377 in four years. In number, however, the electrical fires have shown little difference; during 1917, 15,171 were ascribed to this cause, while there were 15,691 in 1918.

The amount of work involved has made it impossible to further subdivide the electrical causes of fire in the annual tabulations. But for one week, beginning January 12th, the reports on electrical fires were segregated. Of the reports received during this week, 540 covered fires caused by electricity. An analysis of these showed that 252, or 47 per cent., were from electrical irons, and 82 or 15 per cent., were due to flexible cords. This left 206, or 38 per cent., for all



other electrical hazards combined.

The electrical pressing iron is undoubtedly one of the most prolific single causes of fire known. When properly used, it is as safe as the old-fashioned smoothing iron, but under the influence of the well-known American carelessness it becomes an exceedingly dangerous device. Various features have been added in the attempt to make it foolproof, but none has thus far proved to be satisfactory.

The misuse of flexible cords, where employed as extensions of circuits or where exposed to severe mechanical injury, is responsible for fifteen per cent. of our electrical fires. The ordinary householder finds this to be easily handled and not necessarily unsightly, consequently the temptation to the amateur electrician is very great, and leads quite unconsciously to innumerable hazards. Such violations of proper practices are not found when making inspections of new equipments, but are very common in those which have been used for any length of time. Through ignorance, the user of the equipment generally believes himself to be safe, and when attention is called to the hazard he often shows an inspector an extension which has been in use for five or ten years without having ever blown a fuse. Nevertheless, this practice constitutes an ever-present potential hazard, and the older the installation the more serious the hazard is usually found to be.

This consideration leaves 38 per cent. of the electrical fires in the week under discussion to be accounted for. Seventy-six of the fires noted were in attics, basements or on side walls, chiefly attics and basements, and practically all were traceable to mechanical injury or to inexpert tampering. It is a well-known fact that open wiring is much more subject to unauthorized additions than are either concealed knob and tube or conduit installations. It is, therefore, reasonable to assume that some of these fires were from cord extensions, but several reports indicated the wires to have been subject to mechanical injury.

Defective switches, fixtures, etc., were responsible for nineteen fires and the crossing of trolley or high tension wires with service wires for eleven. Motors were shown to have caused six fires, one of the latter with a loss of $25,486 resulting from the ignition by a fan motor of some hangings in a store, and one was started by the fan motor in a motion picture booth. Defective installation at outlets or other definitely stated locations caused fifteen fires, and the remainder were due to a great variety of defects or carelessness, the most interesting being the placing of lamps in beds to warm them. In three cases the absence of lamp guards, resulting in the breakage of lamps, was responsible for a blaze; two of these were in manufacturing plants and one was in a dry cleaning establishment where flammable liquids were used.

Electricity probably has more safeguards thrown around it and receives more inspection than any other hazard, but our statistics show it to be still the cause of more fires than spring from any other single hazard.

The figures quoted show beyond a doubt that an almost unbelievably

large percentage of electrical fires are due to the careless use or to be the absolute misuse of materials and devices, while very few are due to defects in the original installation or in the materials and devices. It would, therefore, seem that education of the public as to the electrical hazards constitutes the only remedy; this is obviously a very long and difficult undertaking.

When we have taught the users and owners of electrical equipments that they must not be added to or changed except by electricians, and that although father's son can install a front door bell which works it does not follow that he can qualify as a first-class electrician, we shall have removed one of the prominent hazards.

An electrical installation deteriorates through wear and tear, but few of us appear to realize the fact. How many inspectors have ever been called upon to inspect an equipment which has not caused any trouble, merely to recommend renewal of worn-out or deteriorated parts? The lighting companies and manufacturers of materials and devices used in electrical work, electrical inspection departments and the Underwriters' Laboratories have co-operated fully in safeguarding electrical hazards, and an installation properly made and kept up presents a minimum hazard. However, the greatest of all fire causes in the United States—American Carelessness—works through this agency to probably a greater extent than any other, save matches alone.

Although electricity is shown by the statistics to be a leading cause of fire, an analysis of electrical fire causes shows that it is more properly speaking simply the agent of that greatest of all fire causes—American Carelessness.—*National Fire Protection Assn. Quarterly.*

There are 3,667,369 horses, 10,084,011 cattle, 3,421,958 sheep, and 4,040,070 swine in Canada (1919).

Fire Dangers of Electric Irons.

An electric iron left turned on . . . Two stores and a cottage completely destroyed.—*Winnipeg Free Press.*

Electrical appliances in the home are of great convenience, but they are, at the same time, a fire danger. Familiarity with their use breeds carelessness, which has resulted in heavy fire losses. From reports received by fire marshals, these are rapidly increasing.

From tests it has been found that fire will break out in from 15 to 90 minutes when the electric iron is left in circuit on a table or ironing board, the time interval depending upon the surface material.

Many devices have been invented to make the electric irons fire-safe. Unfortunately, however, price has been a ruling factor in the sale of this convenience, with the result that cheapness necessarily eliminated the safety attachments. In the absence of public regulation requiring their use, there is little hope of their general adoption. Until the enforcement of legislation requiring fire-safe attachments on all electrically-heated appliances, freedom from fires due to this cause, must, therefore, depend upon educating the public to a recognition of the danger.

HYDRO NEWS ITEMS

Niagara System

GENERAL—Power shortage on the Niagara System during the last ten days was due to two machines being out, one for turbine repairs and one because of a burned-out generator. Repair gangs are working continuously and the machines are expected to be back in service in a day or two.

ST. MARY'S—Mr. D. R. Stephens, Manager of the St. Mary's Water, Light and Heat Commission, has resigned and intends going to Australia. We wish Mr. Stephens every success down on the dry Island.

Mr. Harold Hall of Woodstock has been appointed Manager of the St. Mary's Water, Light and Heat Commission. We congratulate St. Mary's Commission.

TORONTO—Mr. H. H. Couzens has returned from his holiday in Europe and looks fit to face the trouble of another winter of power shortage.

WATFORD—We regret to learn of the death of Mr. Robert Spalding, Superintendent of the Watford Hydro-Electric System. Mr. Spalding was held in high esteem by his many friends and his early passing came as a shock to us all.

Rideau System

GENERAL—High Falls generating station is now supplying the Rideau System with the major portion of power required. The Rideau Power Company has been limited by water supply to the delivery of approximately 100 horsepower.

CARLETON PLACE—Mr. W. C. de K. Rogers of Kingston has been appointed manager of the Carleton Place Public Utilities as successor to Mr. H. M. Miller. He took charge of the Utilities on June 1st.

KEMPTVILLE—The officials of the town of Kemptville are negotiating with the Commission for a supply of power from the Rideau System.

LANARK—A vote was taken in Lanark on September 20th for a supply of power from the Commission, and the by-laws received the almost unanimous consent of the electors. It is proposed to construct a station at Balderson to supply the village with power. About 35 to 50 horsepower will be sufficient.

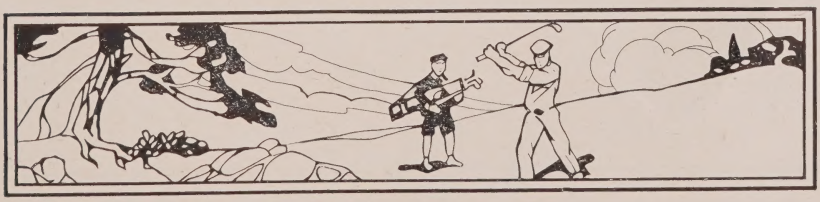
St. Lawrence System

GENERAL—Construction work is progressing on the lines between Cornwall and Alexandria. The erecting of poles is now complete except in the last section of the line. The stringing of wire will be started immediately. Several municipalities are completing the construction of distribution plants in this district.

Recent negotiations have been held with officials of the Toronto Paper Company of Cornwall. This company is making extensive additions to its plant. A considerable increase in power is contemplated, necessitating an increase in the capacity of the high-tension station as well as the substation supplying the company. The company is planning to make Cornwall its headquarters. It estimates that it will require 7,500 horsepower to supply its plant when completed.

Miscellaneous

ARNPRIOR—At the request of municipal officials made some time since, the Commission's representative has visited the municipality to investigate local conditions. A report will be municipality at a later date.



NOTICE

TO ELECTRICAL MANUFACTURERS, JOBBERS AND DEALERS

Electrical material, devices and fittings for use on inside electrical installations in the Province of Ontario, *must not be offered for sale* until their design and construction has been approved by the Hydro-Electric Power Commission of Ontario. (6 Geo. V., Chapter 19, 1916)

Manufacturers whose products are approved and listed by other recognized authorities, and which also meet the requirements of this Commission, may have same placed on the approval list by making application in accordance with Approval Laboratories' Bulletin No. 5, a copy of which will be sent upon request.

ONTARIO DEALERS' ATTENTION IS CALLED TO THE FOREGOING REGULATION—WHICH PROHIBITS THE SALE OF UNAPPROVED ELECTRICAL DEVICES.

APPROVAL LABORATORIES

HYDRO-ELECTRIC POWER COMMISSION
OF ONTARIO

8 STRACHAN AVENUE, TORONTO, ONTARIO

HYDRO MUNICIPALITIES

NIAGARA SYSTEM

Acton	1,563
Ailsa Craig	447
Ancaster	400
Ancaster Township	4,621
Aylmer	2,177
Ayr	809
Baden	710
Barton Township	8,029
Beachville	503
Biddulph Township	1,763
Blenheim	1,533
Bolton	675
Bothwell	700
Brampton	4,238
Brantford	28,725
Brantford Township	8,061
Breslau	500
Brigden	400
Burford	700
Burford Township	3,845
Burgessville	300
Caledonia	1,150
Chatham	15,030
Chippawa	1,095
Clinton	1,948
Comber	800
Copetown	230
Dashwood	350
Delaware	350
Dereham Township	3,233
Dorchester	400
Dorchester S. Twp.	1,389
Drayton	622
Dresden	1,413
Drumbo	375
Dublin	218
Dundas	5,078
Dunnville	3,402
Dutton	858
Elmira	2,238
Elora	1,122
Embro	481
Etobicoke Township	6,586
Exeter	1,431
Fergus	1,609
Flamboro E. Twp.	2,443
Forest	1,418
Galt	12,558
Georgetown	2,010
Glencoe	865
Goderich	4,562
Grantham Township	3,242
Granton	300
Guelph	16,974
Hagersville	1,058
Hamilton	110,137
Harriston	1,381
Hensall	715
Hespeler	2,929
Highgate	379
Ingersoll	5,278
Kitchener	19,767
Lambeth	350
Listowel	2,437
London	58,421
London Township	5,744
Louth Township	2,214
Lucan	640
Lynden	662
Markham	813
Merritton	2,358
Milton	1,750
Milverton	929
Mimico	2,490
Mitchell	1,672
Moorefield	335
Mount Brydges	500
New Hamburg	1,356
New Toronto	2,551
Niagara Falls	12,434
Niagara-on-the-Lake	2,014
Norwich	1,262
Norwich N. Twp.	2,011
Norwich S. Twp.	1,814
Oil Springs	548
Otterville	400
Palmerston	1,815
Paris	4,866
Parkhill	1,202
Petrolia	2,954
Plattsville	500
Point Edward	984
Port Colborne	2,987
Port Credit	1,100
Port Dalhousie	1,391
Port Stanley	732
Preston	4,966
Princeton	600
Ridgetown	2,180
Rockwood	520
Rodney	656
Sandwich	3,448
Sarnia	12,178
Scarborough Twp.	6,566
Seaforth	2,027
Simcoe	3,818
Springfield	426
St. Catharines	19,189
St. George	600
St. Jacobs	400
St. Mary's	3,807
St. Thomas	17,209
Stamford Township	3,702
Stratford	17,143
Strathroy	2,687
Streetsville	475
Tavistock	917
Thamesford	388
Thamesville	808
Thorndale	250
Tilbury	1,623
Tillsonburg	2,788
Toronto	489,681
Toronto Township	4,782
Townsend Township	3,291
Vaughan Township	4,090
Walkerville	5,914
Wallaceburg	3,992
Waterdown	790
Waterford	985
Waterloo	5,105
Waterloo Township	6,378
Watford	1,133
Welland	9,876
West Lorne	700
Wellesley	583
Weston	2,495
Windsor	29,344
Woodbridge	600
Woodstock	10,051
Wyoming	495
Zurich	457
Total	1,122,752

SEVERN SYSTEM

Alliston	1,224
Barrie	6,775
Beeton	492
Bradford	866
Camp Borden	.....
Coldwater	584
Collingwood	7,849
Cookstown	635
Creemore	615
Elmvale	600
Midland	7,339
Orillia	8,058
Penetang	3,664
Port McNichol	564
Stayner	870
Thornton	200
Tottenham	475
Victoria Harbor	1,496
Waubaushene	600
Total	43,006

WASDELL'S SYSTEM

Beaverton	932
Brechin	225
Brock Township	2,871
Cannington	818
Eldon Township	2,085
Gamebridge	70
Kirkfield	.....
Mara Township	2,486
Sunderland	570
Thorah Township	1,116
Woodville	400
Total	11,573

NIPISSING SYSTEM

Callander	650
Nipissing	100
North Bay	9,413
Powassan	519
Total	10,982

MUSKOKA SYSTEM

Gravenhurst	1,502
Huntsville	2,113
Total	3,615

EUGENIA SYSTEM

Alton	450
Artemesia Township	2,392
Arthur	1,027
Chatsworth	257
Chesley	1,703
Derby Township	1,577
Dundalk	700
Durham	1,500
Elmwood	350
Flesherton	378
Grand Valley	558
Hanover	3,225
Holstein	285
Horning's Mills	350
Kilsyth	.....
Markdale	925
Mount Forest	1,716
Neustadt	412
Orangeville	2,173
Owen Sound	11,768
Shelburne	970
Tara	520
Total	33,486

OTTAWA SYSTEM

Ottawa	104,007

THUNDER BAY SYSTEM

Port Arthur	15,100

CENTRAL ONTARIO SYSTEM

Belleville	12,345
Bloomfield	500
Bowmanville	2,853
Brighton	1,387
Cobourg	4,835
Colborne	939
Deloro	347
Deseronto	2,117
Kingston	23,737
Lindsay	7,880
Madoc	1,146
Millbrook	746
Napanee	2,864
Newburgh	426
Newcastle	552
Omemee	467
Orono	700
Oshawa	9,748
Peterborough	20,904
Picton	3,257
Port Hope	4,311
Stirling	823
Trenton	6,107
Tweed	1,292
Wellington	802
Whitby	3,471
Total	114,556

ST. LAWRENCE SYSTEM

Brockville	9,418
Chesterville	925
Prescott	2,660
Williamsburg	200
Winchester	1,047
Total	14,250

RIDEAU SYSTEM

Carleton Place	3,844
Perth	3,545
Smith's Falls	6,356
Total	13,745

ESSEX COUNTY SYSTEM

Amherstburg	2,386
Canard River	50
Cottam	333
Essex	1,753
Harrow	619
Kingsville	1,567
Leamington	3,907
Total	10,615

THOROLD SYSTEM

Thorold	4,325

Frequencies: Niagara and Thorold Systems—25 cycles; all other Systems—60 cycles.

THE aim of The Bulletin is to provide municipalities with a source of information regarding the activities of the Commission; to provide a medium through which matters of common interest may be discussed, and to promote a spirit of co-operation between Hydro Municipalities.